

REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow. The Reply filed April 4, 2011, is herein incorporated by reference in its entirety.

I. Status of Claims

No claims are amended, cancelled or added. Thus, claims 1-2 and 11-36 remain pending. Of these claims, claims 13-36 remain withdrawn.

II. The 35 U.S.C. § 103 Claim Rejection Should Be Withdrawn

The Office Action rejects claims 1-2 and 11-12 under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Published Application No. 2005/0093455 (“Tamura”). Tamura fails to disclose, teach or suggest all the elements of the claimed invention.

Claim 1 calls for a vacuum tube having a reduced-pressure vessel that comprises, among other things, at least a discharge gas and at least one electron wherein “the number of water molecules adsorbed on an inner wall of said reduced-pressure vessel is not greater than 1×10^{16} molecules/cm².”

As a result of the number of water molecules adsorbed being not greater than 1×10^{16} molecules/cm², a long life of a of a reduced-pressure lamp which does not contain a light-emitting material is accomplished. When, however, the moisture concentration contained, such as in an argon gas, is greater than or equal to 100 ppm, characteristics are significantly degraded in a reduced pressure lamp (Applicants’ specification as filed at ¶¶ [0021] – [0022] & Figs. 7-8). Taking this degradation into account, Applicants looked at the relationship between the moisture concentration contained in a gas atmosphere at atmospheric pressure and the moisture amount adsorbed on the inner wall of a vessel (Applicants’ specification as filed at ¶¶ [0021] – [0022]). As a result, Applicants found that the moisture concentration of 100 ppm contained in the gas atmosphere at the atmospheric pressure corresponds to the moisture amount of the number of the water molecules of 1×10^{16} molecules/cm² adsorbed on the inner wall of a vessel (Applicants’ specification as filed at ¶¶ [0021] – [0022]).

The Office Action acknowledges that “Tamura does not specifically disclose the number of water molecules absorbed on an inner wall of the reduced pressure vessel is not greater than 1×10^{16} molecules/cm³,” but asserts that “it is widely known in the art to reduce water molecules absorbed on an inner wall because higher water molecules would deteriorate layers such as phosphor layers which would reduce the reliability of the lamp” (Office Action at p. 3).

Tamura discloses a headlight apparatus for a vehicle that uses a light-emitting material free from mercury where “the amount of water contained in the metal halide 6 under the extinguished state of the metal halide lamp 1 is controlled to 50 ppm or less” (Tamura at ¶¶ [0015] & [0062]). Consequently, Tamura discloses that the amount of water in a light-emitting material is 50 ppm or less. Tamura discloses that “in the Hg-less metal halide lamp, it is impossible to prolong sufficiently the life of the lamp by simply decreasing the amount of the OH groups contained in the quartz glass and by decreasing the amount of water contained in the rare gas, with the result that the Hg-less metal halide lamp having a long life cannot be obtained with high reproducibility” (Tamura at ¶ [0009], emphasis added). Tamura also discloses that “[i]t is considered reasonable to understand that the decrease of the lamp life of the Hg-less metal halide lamp is affected by the water contained in the metal halide sealed in the discharge container as a light-emitting material” (Tamura at ¶ [0009]). Thus, Tamura discloses that obtaining a sufficient long life in the Hg-less metal halide lamp cannot be accomplished by decreasing the amount of water contained in a rare gas, but rather that the water contained in a metal halide as a light-emitting material should be decreased to 50 ppm or less. As a result, Tamura only discloses the amount of water contained in the metal halide alone and not in anything else, such as in a discharge space 2a or an inner wall.

Tamura fails to teach the above noted feature of the invention. Specifically, Tamura fails to disclose, teach or suggest “the number of water molecules adsorbed on an inner wall of said reduced-pressure vessel is not greater than 1×10^{16} molecules/cm²” as recited in claim 1.

For at least the aforementioned reasons and those included in the Reply filed April 4, 2011, the rejection of claim 1 is improper. Claims 2 and 11-12 depend from claim 1 and are

allowable, therewith, for at least the reasons that claim 1 is allowable in addition to their respective recitations.

CONCLUSION

Applicants believe that the present application is in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extension fees to Deposit Account No. 19-0741.

Respectfully submitted,

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